Reflection Questions

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1. How did you decide the number of hidden layers and neurons?

- **Simple Answer:**
  - I chose 2 hidden layers because it's a common choice for complex patterns.
  - I picked 32 neurons in each layer — enough to learn well but not too many to cause problems.
  - I tried adding more layers and neurons, but it didn't help much and made training slower.

  Observation:
  - For spiral shapes, you need more than one layer to capture the curves properly.

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2. How did different learning rates affect the results?

- **Simple Answer:**
  - I used the default learning rate of the Adam optimizer (0.001), which worked well.
  - When I increased it to 0.01, training got faster but sometimes unstable.
  - Lowering it to 0.0001 made training too slow.

  Observation:
  - Adam does a good job managing the learning rate, so I didn't need to adjust it much for this task.

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3. Did you encounter overfitting or under fitting? How did you deal with it?

Simple Answer:

- After about 300 epochs, the validation accuracy stopped improving, and the loss went up a bit.
- This showed that mild overfitting was starting.
- But it wasn't a big issue, so I kept training until 300 epochs.

If needed, I could fix it by:

- . Using early stopping
- .Adding dropout layers
- .Using a smaller model

 Observation:

- If validation loss goes up while training loss goes down, that's overfitting.
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4. If you had more time, how would you further improve the model?

Simple Ideas:

- Try dropout to reduce overfitting.
- Look into different activation functions like tanh.
- Add a learning rate scheduler to change the learning rate during training.
- Explore advanced models like Convolutional Neural Networks (CNN) for fun, even if not needed.
- Tune hyperparameters with tools like Kerastuner or Grid search.

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